

In re Patent Application of:
COFFA ET AL.
Serial No. 09/653,390
Filing Date: September 1, 2000

In the Claims:

Claims 1-27 (cancelled).

28. (currently amended) A semiconductor laser device for electro-optic applications comprising:

a semiconductor substrate;

a doped P/N junction integrated with said semiconductor substrate, said doped P/N junction comprising a depletion layer and having a shape defining a waveguide, said depletion layer comprising at least one rare-earth material for providing a coherent light source, all of said at least one rare-earth material remaining in said depletion layer when the semiconductor laser device is operating; and

a biasing device connected to said doped P/N junction for reverse biasing thereof to produce coherent light by pumping said at least one rare-earth material at room temperature;

said at least one rare-earth material being buried within said doped P/N junction at a depth sufficient for defining an acceleration space between a region of said doped P/N junction that generates carriers when said at least one rare-earth material is being pumped, the acceleration space allowing the carriers to be accelerated before reaching said at least one rare-earth material.

Claim 29 (cancelled).

30. (currently amended) A semiconductor laser device according to Claim 28, wherein said at least one rare-earth material in the depletion layer of said doped P/N junction forms a base-collector region for a bipolar transistor.

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31. (currently amended) A semiconductor laser device according to Claim 28, wherein said at least one rare-earth material comprises erbium.

32. (currently amended) A semiconductor laser device according to Claim 28, further comprising a protective layer partially on said doped P/N junction to delimit sides of the waveguide, said protective layer having a lower dielectric constant than a dielectric constant of said doped P/N junction.

33. (currently amended) A semiconductor laser device according to Claim 28, further comprising a buried reflecting layer to delimit a bottom of the waveguide.

34. (currently amended) A semiconductor laser device according to Claim 28, wherein said semiconductor substrate comprises a silicon on insulator (SOI) substrate.

35. (currently amended) A semiconductor laser device according to Claim 28, further comprising an epitaxial layer on said semiconductor substrate.

36. (currently amended) A semiconductor laser device according to Claim 28, wherein said doped P/N junction is stacked so that the shape of the waveguide is a ribbed elongated structure projecting from a surface of said semiconductor substrate.

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37. (currently amended) A semiconductor laser device according to Claim 28, wherein said semiconductor substrate comprises silicon.

38. (currently amended) A semiconductor laser device comprising:

a semiconductor substrate;

a doped P/N junction integrated with said semiconductor substrate, said doped P/N junction comprising a depletion layer and having a shape defining a waveguide, said depletion layer comprising at least one rare-earth material for providing a coherent light source, and all of said at least one rare-earth material remaining in said depletion layer when the semiconductor laser device is operating; and

a biasing device connected to said doped P/N junction for reverse biasing thereof to produce coherent light from the coherent light source by pumping said at least one rare-earth material;

said at least one rare-earth material being buried within said doped P/N junction at a depth sufficient for defining an acceleration space between a region of said doped P/N junction that generates carriers when said at least one rare-earth material is being pumped, the acceleration space allowing the carriers to be accelerated before reaching said at least one rare-earth material.

39. (previously amended) A semiconductor laser device according to Claim 38, wherein said at least one rare-earth material in the depletion layer of said doped P/N junction forms a base-collector region for a bipolar transistor.

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Claim 40 (cancelled).

41. (previously added) A semiconductor laser device according to Claim 38, wherein said at least one rare-earth material comprises erbium.

42. (currently amended) A semiconductor laser device according to Claim 38, further comprising a protective layer partially on said doped P/N junction to delimit sides of the waveguide, said protective layer having a lower dielectric constant than a dielectric constant of said doped P/N junction.

C 43. (previously added) A semiconductor laser device according to Claim 38, wherein said doped P/N junction is stacked so that the shape of the waveguide is a ribbed elongated structure projecting from a surface of said semiconductor substrate.

44. (previously added) A semiconductor laser device according to Claim 38, wherein said semiconductor substrate comprises a silicon on insulator (SOI) substrate.

45. (previously added) A semiconductor laser device according to Claim 38, further comprising an epitaxial layer on said semiconductor substrate.

46. (previously added) A semiconductor laser device according to Claim 38, further comprising a buried reflecting layer to delimit a bottom of the waveguide.

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47. (previously added) A semiconductor laser device according to Claim 38, wherein said semiconductor substrate comprises silicon.

Claims 48-54 (cancelled).
